Changyi Li

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Education

University of California, Berkeley (UC Berkeley)

Ph.D. in Department of Chemical and Biomolecular Engineering, 2015, GPA: 3.90

Thesis: *Engineered Transport in Microporous Membranes for Clean Energy Technologies*

California Institute of Technology (Caltech)

B.S. in Chemical Engineering, 2010, GPA: 3.67

Qualifications

Leadership and Collaboration

Spearheaded and contributed to fruitful multidisciplinary projects with researchers in two national labs and six universities

Authored successful user proposals to gain and maintain access to synchrotrons (Advanced Light Source (**ALS**), Stanford Synchrotron Radiation Lightsource (**SSRL**)) and **The Molecular Foundry,** a Department of Energy nanoscience user facility.

Adaptability

Involved in projects spanning a wide spectrum of scientific topics

Self-assembly: Biomimetic macrocycle self-assembly, block copolymer self-assembly

Gas Transport: Nanocrystal surface chemistry, layered metal-organic framework/polymer hybrid membrane

Ion Transport: Battery technologies, single-ion conducting polymer, intrinsically microporous polymer

Brought online new experimental capabilities

Deployed **LabView** for instrument interfacing and automation.

Fabricated and machined parts to assemble homemade experimental apparatuses.

Technical Skills: Synthesis and characterization of small molecules, macrocycles, polymers and nanocrystals with techniques including but not limited to

- *Specialized synthesis*
  - Solid-Phase Peptide Synthesis (**SPPS**)
  - Reversible Addition-Fragmentation chain Transfer polymerization (**RAFT**)
- *Imaging*
  - Transmission Electron Microscope (**TEM**)
  - Atomic Force Microscopy (**AFM**)
- *Various spectroscopy techniques*
- *Thin-film characterization*
  - *Ellipsometry and interferometry*
- *Synchrotron X-ray*
  - Grazing-Incidence Small-Angle X-ray Scattering (**GISAXS**)
  - Grazing Incidence X-ray Diffraction (**GIXD**)
  - X-ray Absorption Spectroscopy (**XAS**)

Quantitative Mathematics

Solid grasp of **applied mathematics** at the graduate level.

Extensive coursework in **statistical analysis**.

Constructed models to understand and explain experimental results

Programming

Routinely use **Matlab**, **Mathematica** and **R** for research and teaching purposes.

Experience in **Java, PHP**, **MySQL** and **C**.

Languages

Fluent in **English**, **Mandarin** and **Cantonese Chinese**.

Previous Experience

Summer Undergraduate Research Fellowships (SURFs)

2009: SURF at California Institute of Technology under the mentorship of Dr. David A. Boyd. Final project paper: ***Phenomena of Metallic Nanoparticle Patterned by Block Copolymer Lithography.***

2008: SURF at Hong Kong University of Science and Technology under the mentorship of Prof. Ben Zhong Tang and graduate student Jianzhao Liu. Final project paper: ***Synthesis and Characterization of 1,1-Dialkyl-3,4-Diphenyl-2,5-Bis(ethynylaryl)siloles and Their Related Polymers.***

2007: SURF at California Institute of Technology under the mentorship of Prof. P.O. Wennberg and graduate student Gretchen Keppel Aleks. Final project paper: ***Analysis on Carbon Monoxide Data Retrieved through Ground-based Fourier Transform Spectrometer.***

Teaching Assistantships / Graduate Student Instructor Appointments

UC Berkeley: Graduate student instructor

Spring 2013, Chemical and Biomolecular Engineering 150A, **Transport Processes**.

Fall 2011, Chemical and Biomolecular Engineering 142, **Chemical Kinetics and Reaction Engineering**.

Caltech: Undergraduate teaching assistant

Winter 2009, Chemistry 24a: **Introduction to Biophysical Chemistry**.

Fall 2008, Chemical Engineering 64: **Principles of Chemical Engineering**.

Publications

1) **Li, C.;** Ward, A. L.; Doris, S. E.; Pascal, T. A.; Prendergast, D.; Helms, B. A., Polysulfide-Blocking Microporous Polymer Membrane Tailored for Hybrid Li-Sulfur Flow Batteries, *Nano Lett.*, **2015**, *15* (9), 5724–5729.
2) **Li, C.**, Helms, B. A., Engineered Transport in Microporous Membranes for Clean Energy Technologies. *In preparation*.
3) Lorenzo, M., Meckler, S. M., **Li, C.**, Helms, B. A., Minute-MOFs: Ultrafast Synthesis of Expanded MOF-74 from Divalent Metal Oxide Colloidal Nanocrystal Precursors, *In submission*.
4) Meckler, S. M.; **Li, C.**; Queen, W. L.; Williams, T. E.; Long, J. R.; Buonsanti, R.; Milliron, D. J.; Helms, B. A., Sub-micron Polymer–Zeolitic Imidazolate Framework Layered Hybrids via Controlled Chemical Transformation of Naked ZnO Nanocrystal Films, *Chem. Mater.*, **2015**, *27* (22), 7673-7679.
5) Doris, S. E., Lynch, J. J., **Li, C.**, Wills, A. W., Urban, J. J., Helms, B. A., Mechanistic Insight into the Formation of Cationic Naked Nanocrystals Generated under Equilibrium Control. *J. Am. Chem. Soc.*, **2015**, *136* (44)**,** 15702–15710.
6) Boyd, D. A., Hao, Y., **Li, C.**, Goodwin, D. G., Haile, S. M., Block Copolymer Lithography of Rhodium Nanoparticles for High Temperature Electrocatalysis. *ACS Nano*, **2013,** *7* (6)**,** 4919–4923.
7) Hourani, R., Zhang, C., van der Weegan, R., Ruiz, L., **Li, C.**, Keten, S., Helms, B. A., Processable Cyclic Peptide Nanotubes with Tunable Interiors, *J. Am. Chem. Soc.*, **2011**, *133* (39)**,** 15296–15299.

Patents

1) Helms, B. A.; **Li, C.**; Ward, A. L.; Doris, S. E. "Ion- and Size-Selective Membranes for Electrochemical Energy Storage Devices Based on Polymers with High Intrinsic Microporosity" Patent Application pending.
2) Helms, B. A.; Doris, S. E.; **Li, C.** "Ionic Nanocrystalline Materials with High Surface Charge Density and Composites of the Same" Patent Application 61/981,668.

Conferences and Presentations

1) **Porous Polymer Membranes Tailored for a Hybrid Lithium-Sulfur Flow Battery**. Oral presentation at the Materials Research Society Spring Meeting, April 2015.

2) **A Microporous Polymer Membrane for Lithium-Sulfur Flow Batteries**. Poster presentation at the Polymers Gordon Research Conference / Seminar, June 2015.
3) **Polysulfide-Blocking Microporous Polymer Membranes for Hybrid Li-Sulfur Flow Batteries**. Poster presentation at the Joint Center of Energy Storage Research (JCESR) full program meeting, April 2015.
4) **Ion-Transducing Polymer-Inorganic Interfaces Embedded in Membranes for Non-Aqueous Flow Batteries**. Poster presentation at the JCESR full program meeting, January 2015.
5) **Electrostatic Superhighways: Ion-Transducing Polymer-Inorganic Interfaces Embedded in Membranes for Non-Aqueous Flow Batteries**. JCESR hub-wide webinar presentation, December 2013.
6) **Functionalization of Subnanometer Cavity within Cyclic Peptide Framework.** Poster presentation at Center for Gas Separation All-Hands Meeting, September 2012.

Awards

James J. Morgan SURF Fellow	2007
Sunney I. Chan Scholarship	2007 – 2010
Paul K. and Evalyn Cook Richter Memorial SURF Fellow	2009